ABSTRACT

The present invention pertains to annealing a high dielectric constant (high-k) material in a manner that substantially reduces or eliminates disadvantages and problems heretofore associated with the same. In particular, the high-k material is annealed in an ambient having a single chemistry of nitrogen and hydrogen, such as ammonia (NH_3), to nitride and react unwanted impurities, and an oxidizer to oxidize and densify the high-k material, while mitigating growth of a lower-k material at an interface of the high-k material and an underlying substrate. Additionally, particular temperatures and pressures are utilized within the process so that the risk of an undesired exothermic reaction is mitigated. Annealing the high-k material in accordance with manners disclosed herein has application to semiconductor fabrication processes and, as such, is discussed herein within the context of the same.